Electronic Version
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Claims

[c1] 1. A turbine or other apparatus of power generation using means responsive to a motive fluid wherein:
the motive fluid is free flowing seawater, particularly that which is affected by:
natural or man-made rises in elevation of the ocean floor or any other bathymetric constriction of free flow so as:
to break oceanic wave motion such that the wave or tidal energy is transferred into accelerating the water itself,
from the force of this accelerated water, energy is extracted.

[c2] 2. A turbine or other apparatus of power generation using means responsive to a motive fluid wherein the fluid intake is implemented via a gate or penstock which is:
mechanically or electro-mechanically able to instantaneously adjust its physical orientation in any direction,
to adapt to changes in the direction of the streamlines of a free flowing motive fluid.

[c3] 3. The apparatus of claim 2 wherein said free flowing motive fluid is seawater, particularly that which is affected by:

natural or man-made rises in elevation of the ocean floor or any other bathymetric constriction of the free flow so as:

to break oceanic wave motion such that the wave or tidal energy is transferred into accelerating the water itself,

from the force of this accelerated water, energy is extracted.

[c4] 4. The apparatus of claim 2 wherein said motive fluid is a free flowing body of water in any form including but not limited to rivers, creeks, inlets, tidal bores, rapids, or waterfalls.

[c5] 5. The apparatus of claim 2 wherein said fluid intake is covered with a screen to prevent fish and other aquatic life forms and debris from entering the intake.

[c6] 6. The apparatus of claim 2 wherein said fluid intake has a shroud which is buoyant so as to optimally extract energy from an upper non-turbulent layer of said free flowing motive fluid.

[c7] 7. The apparatus of claim 2 wherein said fluid intake has:

a gate comprised of a plurality of wickets that are adjustable,
interior flow vanes that are adjustable and,
runner blades mounted on a coaxial fluid coupler or impeller and are adjustable,
so as to optimize efficiency over a range of loads and flow velocities.

[c8] 8. The apparatus of claim 7 wherein said interior vanes are shaped or rotated such that if said free flowing motive fluid is turbulent exterior to the intake, it is channeled into laminar and or vortical streamlines internal to the intake.

[c9] 9. The apparatus of claim 7 wherein adjustment of said gate wickets, flow vanes and runner blades is performed by:

each set of gate wickets, flow vanes, or runner blades actuating by means of a singular DC stepper motor with rotor output shaft affixed to, or forged or cast into a pinion meshed to:
a circular rack gear to translate torque and rotational gear ratios, with
a bi-directional anti-backlash and position locking mechanism propelled by a spring loaded solenoid

operating synchronously to said DC stepper motor, said rack gear synchronously meshing to:
a plurality of pinions affixed, forged or cast to each shaft of said gate wickets, or flow vanes, or runner blades.

[c10] 10. The apparatus of claim 2 wherein said apparatus is physically secured by:
a mounting system comprised of circular bearings in one axis or plural axes commonly implemented as a gimbal,
to provide the ability to instantaneously adjust the physical orientation of said fluid intake in any direction,
to adapt to changes in the direction of said free flowing motive fluid.

[c11] 11. The apparatus of claim 10 wherein the shroud element of said fluid intake contains fixed vanes or rudders on its exterior to enable it:
to respond to changes in the direction of said free flowing motive fluid and thus ensure:
the face area of said intake is always physically orthogonal to the direction of the streamlines of said free flowing motive fluid.

[c12] 12. The apparatus of claim 10 wherein the shroud element of said fluid intake contains rotatable vanes or rudders on its exterior to enable it to:

respond to change in the direction of said free flowing motive fluid and thus ensure

the face area of said intake is always physically orthogonal to the direction of the streamlines of said free flowing motive fluid; and also,

temporarily once over a long term period affect the orientation of the face area of said fluid intake such that it no longer is orthogonal to the direction of the free flowing motive fluid streamlines thus causing the motive fluid to remove tenacious debris from the face of said intake during a routine self-maintenance period.

[c13] 13. The apparatus of claim 10 wherein said mounting system is affixed to a short rail system so that the location of the apparatus can be adaptively located to an optimal location such as the onshore side of the breaking waves, or the location of highest velocity flow in any body of water.

[c14] 14. The apparatus of claim 13 wherein said location of the apparatus on the rail system is determined by:

a means of sensing the location of breaking waves or greatest flow velocity using accelerometers or scales

mounted on buoys; and/or,

an electronic microprocessor system with an almanac in memory indicating tide level and/or relative mean location of the breaking waves with respect to the rail at any given time.

[c15] 15. The apparatus of claim 10 wherein the kinetic energy contained in the motive fluid is converted to electrical potential.

[c16] 16. The apparatus of claim 15 wherein said kinetic energy contained in the motive fluid is converted to electrical potential by means of a coaxial fluid coupler or impeller:

directly driving the rotor of an AC induction generator of sufficient number of poles such that said generator's synchronous frequency is much lower than the average rotational velocity of said fluid coupler or impeller thus operating said AC induction generator most of the time in the generator region of its torque-slip curve; or,

indirectly driving the rotor of an AC induction generator through a system of gears which increase the rotor rotational velocity such that said generator's synchronous frequency is much lower than the average rotational velocity of said rotor itself thus operating said AC induction generator most of the time in

the generator region of its torque-slip curve; so that, the armature voltage of said AC induction generator may be directly applied to the utility power grid.

[c17] 17. The apparatus of claim 15 wherein said kinetic energy contained in the motive fluid is converted to electrical potential by means of a:

coaxial fluid coupler or impeller:

directly driving the rotor of a DC generator; or,

directly driving or indirectly driving through a system of gears, an AC induction generator with external voltage rectifiers producing a direct current output.

[c18] 18. The apparatus of claim 17 wherein said fluid intake contains a gate that is controlled by sensing motion in said gimbal,

so as to inhibit flow to reduce the rotational velocity of said coaxial fluid coupler or impeller thus:

reducing the forces of gyroscopic precession,

so to quicken the response to changes in the direction of the streamlines of a free flowing motive fluid.

[c19] 19. The apparatus of claim 17 wherein the voltage output of said DC generator or said AC induction generator with external voltage rectifiers is sensed to control a gate which:

inhibits flow to reduce the rotational velocity of said

coaxial fluid coupler or impeller thus:
reducing the forces of gyroscopic precession,
so to quicken the response to changes in the direction of the streamlines of a free flowing motive fluid.

[c20] 20. The apparatus of claim 17 wherein the voltage output of said DC generator or said AC induction generator with external voltage rectifiers is sensed:
to control adjustable interior flow vanes and adjustable runner blades of the fluid coupler or impeller by employing:
a voltage feedback closed loop so as to:
optimize efficiency over a range of loads and flow velocities.

[c21] 21. The apparatus of claim 17 wherein the voltage output of said DC generator or said AC induction generator with external voltage rectifiers is:
electronically voltage and current regulated for:
charging any of the presently available varieties of chemistry of battery.

[c22] 22. The apparatus of claim 17 wherein the voltage output of said DC generator is:
electronically voltage and current regulated for driving a:
DC motor mechanically coupled to a:

synchronous AC generator with output armature voltage applied directly to the utility power grid.

[c23] 23. The apparatus of claim 17 wherein the voltage output of said DC generator or said AC induction generator with external voltage rectifiers is:

electronically voltage and current regulated for:

performing electrolysis of water to produce hydrogen fuel.

[c24] 24. The apparatus of claim 23 wherein the output gas fuel tanks provide buoyancy to said fluid intake so as to optimally extract energy from an upper non-turbulent layer of the free flowing motive fluid.

[c25] 25. The apparatus of claim 17 wherein further energy may be extracted by implementing an auxiliary DC generator or AC induction generator with external voltage rectifiers indirectly coupled through a system of gears to one axis or plural axes of said gimbal.

[c26] 26. The apparatus of claim 25 wherein the armature current of said auxiliary DC generator or AC induction generator with external voltage rectifiers may be reversed temporarily once over a long term period so as:

to use the secondary generator as a motor to affect the orientation of the face area of said fluid intake

such that it no longer is orthogonal to the direction of the streamlines thus:
causing the motive fluid to remove tenacious debris from the face of the intake during a routine self-maintenance period.

[c27] 27. The apparatus of claim 2 wherein said intake physical orientation is controlled by an electronic microprocessor.

[c28] 28. The apparatus of claim 7 wherein said adjustable gate wickets, interior flow vanes and runner blades are controlled by an electronic microprocessor.

[c29] 29. The apparatus of claim 12 wherein said rotatable external vanes or rudders are controlled by an electronic microprocessor.

[c30] 30. The apparatus of claim 18 wherein said gate is controlled by an electronic microprocessor sensing said motion in the gimbal.

[c31] 31. The apparatus of claim 19 wherein said gate is controlled by an electronic microprocessor sensing said voltage output of the DC generator or AC induction generator.

[c32] 32. The apparatus of claim 21 wherein said charging of a

battery, including gauging and communicating the fullness of the battery is controlled by an electronic microprocessor.

[c33] 33. The apparatus of claim 23 wherein said process of electrolysis of water to produce hydrogen fuel, including gauging and communicating the fullness of the output gas tanks is controlled by an electronic microprocessor.

[c34] 34. The apparatus of claim 26 wherein said intake physical orientation is controlled by an electronic microprocessor.